The Tribune Radio—News of the Air Routes—*By Jack Binns*

Beverage Wire Removes the Static Pest

Aerial Equal in Length to One Full Wave Length Successfully Used to Overcome Interference

Is Directional in Effect

MadeAmateurTrans-Atlantic Test Successful on Less Than One Horsepower

A very remarkable aerial has been devised which has greatly increased the efficiency of trans-Atlantic wireless telegraphy. It is known as the Beverage antenna, and its use has materially reduced static interference, in fact so much so that engineers are experimenting with it for use in the reception of broadcast radiophone entertainment.

The most notable achievement of the Beverage antenna was in December of last year, when Paul Godley, the famous American amateur, used it in Scotland on the occasion of the amateur trans-Atlantic radio tests. With this type of aerial Godley succeeded in receiving no fewer than twenty-seven different American amateur stations, every one of which was using less than one kilowatt of power in their transmitters. In his report of the test Godley wrote:

"On Wednesday the 7th the 1,300 foot stretch of line was completed, the wire being supported by 2x4 inch posts twelve feet high and laid out to point directly toward Chicago. The wire was grounded at the distant end through a non-inductive resistance (250 to 400 ohms) and at the home end through a variable inductance of the order of 0.1 microhenry in value. This constitutes the Beverage antenna.

Aerial Equals One Wavelength

"For any given wavelength the wire should be one or two even wavelengths long. Arrangements were made to change the length of the wire, it being necessary in each case to shift the non-inductive resistance and ground connection from one suporting pole to another.

"Signal potentials built up in such a wire are approximately equivalent to those which would be built up in a vertical wire one-tenth (at most) of its total length. When working at 200 meters and having a wire length of approximately 650 feet (one wavelength), signal potentials produced in the wire would be equivalent to those produced in a vertical wire 65 feet in height, or, if the full wire were used, 130 feet in height, at that wavelength. Furthermore, the system is highly directional, and eliminates a great portion of the atmospherics and interference coming from directions other than those from which one wishes to receive.

"That this condition did exist was proved by comparison with a small vertical wire supported by a nearby tree. Static-to signal ratio in all cases was decidedly better on the Beverage wire."

Of course, it will be seen at the outset that such an aerial cannot be used by every radio fan, because of its great length, and the fact that only a few persons, comparatively speaking, can erect such a long wire.

Aerial Nine Miles Long.

Perhaps the best way to explain the operation of this type of antenna will be by describing its use in connection with the gigantic station at Radio Central, Riverhead, L. I. This station receives from the long distance European stations which are using wavelengths ranging around 15,000 meters in length, or, in other words, each electro-magnetic wave sent out from these stations is approximately nine miles in length.

Now in order to fulfill all of the requirements of the theory covering the operation of the Beverage antenna, it is necessary to have a receiving aerial one full wave length long, or, in other words, a receiving aerial nine miles in length. This is exactly what has been installed at Riverhead. The aerial is nine miles long, and is supported on poles thirty feet above the ground, one end being grounded through a non-inductive resistance, and the other through a variable inductance. With this wire the Riverhead station is daily receiving five different European stations simultaneously without interference.

In designing this aerial advantage was taken of the fact that static is to a certain extent greatly localized, and also of the fact that certain types of aerial are very directional in effect. The non-inductive resistance at one of the antenna soaks up the interference and passes it to ground.

Static Is Immature Lightning

For instance, static is lightning in the making, and a congested center such as New York, with its heated air rising from the big buildings, produces a great quantity of local static. This would be a very serious situation for Riverhead but for the location of New York, which makes a Beverage antenna very effective in eliminating this local static, as the signals are coming from the opposite direction to the static.

In order to illustrate the operation of the Beverage antenna G. H. Clarke, an engineer of the Radio Corporation, has drawn the following analogy for our readers:

"If we look upon the Beverage antenna as a large lake," he says, "and the wind as the static, we can get an idea how it works. Now, suppose the wind is blowing across the lake from east to west. At the eastern end there will be little or no ripples, but as we get to the western end the ripples will gradually increase in size to full waves. If the shore at the western end is a gentle slope of sandy gravel the waves will be dissipated and will not be reflected.

"If, on the other hand, the shore of the lake is precipitous and rocky the waves will be reflected and will disturb the eastern end of the lake. Now the Beverage antenna, having a non-inductive resistance at its non-receiving end, corresponds to a sandy shore, because it absorbs the static and interfering waves and does not reflect them.

Analogy Explains System

"Carrying the analogy further, if we place a stationary paddle wheel at the western end of the lake, which is revolving uniformly and producing waves of a uniform character, these waves will travel steadily forward toward the eastern end and will not be interrupted by or stopped by the wind. This paddle wheel corresponds with the transmitting station and the waves it sends out are equivalent to the waves from the European station.

"The tests that have been conducted at Riverhead completely confirm this theory. When we place our receiving apparatus at the end which is grounded through the non-inductive resistance it is impossible to hear anything but a terrific roar of continuous static discharge. Using the wire properly as a Beverage antenna, we are able to conduct trans-Atlantic wireless communication without any difficulty whatsoever, despite the static.

"These facts are so significant that we are carrying out a series of experiments with short waves. These so far are very promising, but as yet are not complete, and until they are we do not intend making any announcement concerning them.

"Of course, we realize that people dwelling in cities cannot erect Beverage antennae, and consequently we are seeking some other means to overcome the static situation so far as they are concerned. The Beverage antenna suggests several promising methods, which we hope will solve the problem."

Making Moves in Ancient Game Via Ether

The photographer said, "Photo shows Miss Rosalind Kendall, of New York, calling her move, while her friend in Chicago sends back by radiophone." In the excitement of the moment she forgot to put the transmitting tubes in their sockets

Britain to Let Down Barriers Against Home Radiophone Sets

Marconi Head Declares England Will Give America Good Race for Supremacy When She Starts; Claims Superiority in Tube Sets

By Warre B. Wells

From The Tribune's European Bureau

LONDON, April 21.—England, which to-day can claim no more than a few thousand radio fans against the million of the United States, plans to start in on the business right away and show America just how the radio game should be played.

The authority for this statement is no less a person than Godfrey Isaacs, managing director of Marconi's Wireless Telegraph Company, who has just arrived in London after a visit to the Continent. Isaacs looks forward to the time when there is going to be a radio receiving set in every English home, and this time is coming soon, he says.

What is the matter with radio in England? Why is this country so far in such an inferior position to the United States in wireless development? Godfrey Isaacs answers these questions in two words—"government control." The use of receiving apparatus by private persons has been made almost impossible up to the present by the constant nuance of the licensing system by the Postoffice.

British Well Ahead Is Claim

The position in this country, it must be allowed, has been a little different from that in the United States; wartime conditions have necessarily given a point of view that the American authorities have not had to take. It is not due, it is claimed, to any lack of technical skill or knowledge that wireless telephony has not made any comparable strides over here. British experts are not one bit behind American, and in the handling of valve reception and transmission are possibly in advance, it is said. The one difficulty has been the official restrictions.

Now, according to Godfrey Isaacs, the postoffice is going to change its policy and to allow every facility for the extension of wireless telephony. An important announcement is expected when Parliament reassembles. And when the restrictions have been removed or modified there will be nothing to prevent a very big advance.

Godfrey Isaacs thinks that government control in the early stages of radio in this country may turn out in the end to have been a good thing. He hoped, he said, that England would take the new extension in a more serious and sober way than it had been taken across the Atlantic. "I don't want to see 'radio flu' here," remarked Marconi's managing director. "In America the boom is rather premature. The equipment in use is rather primitive and not such as we should like to see employed here. I think that America is going ahead too fast in this direction, and I can foresee chaotic conditions if indiscriminate and vast use of wireless telephony comes," he added.

Marconi "Lying Low"

Outlining his company's plans as soon as the Postmaster General gives facilities, Godfrey Isaacs said: "We have been lying low for a long time, spending many thousands of pounds in research and improvement, and no country in the world is better equipped than we are to-day to put wireless communication into general use. This is not merely a scheme. We can do it as soon as we get the word 'Go' from the government."

The Marconi company's plan is to have broadcasting stations, say two or three, in different parts of the country, and to have a program for different hours of the day. It will transmit by particular wave lengths, which will be so confined as to reach only those who use particular receivers. This, in Isaac's view, will avoid the danger of cacophony, which may be experienced in America.

He proposes that receiving sets should not be sold outright, but hired out at a charge which will not be more than the cost of present telephone installations. The American practice of selling the apparatus is, he thinks, a great mistake. Modifications, he points out, will be introduced in the apparatus from time to time, and once a man had bought his set he would not feel happy if soon after, he had to buy something better. Experts here agree emphatically with his statement that scientifically England is able to do everything that is done in America, and to do it on sounder lines.

English Press Backs Plan

The British press is rapidly lining up behind the drive. "America," says one paper, "has already embraced this new era with both arms. Just as it seized the idea of the film with eager hands, so it has gripped the idea of a wireless telephone in every home. American imagination, American initiative, American energy are driving the new era along at a gallop."

What does the wireless telephone in the home mean? asks another. "It means a great new industry, astounding extension of knowledge, immeasurable sources of entertainment, better business facilities, new political methods, an end to home isolation and dullness.

"Step into the home telephone era." That is the new English slogan.

Union College Radio Set Increased in Range

Transmitting Apparatus of the Student Body Now Uses One Horsepower

By Lewis B. Sebring Jr., '23
Union College

Radio broadcasting was introduced to the people of eastern New York state by the Union College Radio Club on the night of October 14, 1920, when phonograph music was sent through the air to people within a 100-mile radius of Schenectady, N. Y., home of the college. For the next two months this station, conducted entirely by college students, was the first one in the United States to regularly broadcast musical programs. Soon after the start of the first commercial broadcasting station the Union radio operators added to their weekly concerts complete Sunday night church services, with college professors giving the sermons.

Although radio work is entirely outside the regular curriculum followed at Union College, it has grown in importance until at present it is considered one of the foremost activities at the institution. Since they sent out the first program in 1920 the students have succeeded in reaching, via the radiophone route, practically every state in the Union east of the Mississippi River and north of the Carolinas, to say nothing of many provinces in Canada, and ships far out on the Atlantic.

The old license 2XQ, which became familiar to hundreds in the vicinity of Schenectady, has been supplanted by license WRL, under which the college is now broadcasting regular Sunday night educational programs. The weekly programs are now such as might be expected from an educational institution.

In the matter of apparatus the Union Radio Club is particularly well equipped. The latest addition to the sending station, and the set which is now being used to broadcast under WRL, is a 1-kilowatt phone set, using four 250-watt transmitting tubes. The principal item of the set is a 2,000-volt direct current generator, installed in the electrical engineering building of the college. This gives the set nearly four times the capacity of the one formerly used and about twice the sending radius. The antenna is of the fan type, 60 feet high and 70 feet long, with radial counterpoise and buried grounds.

What the future holds for the student organization is as much a matter of conjecture as it is with the larger commercial broadcasting stations. It is the wish of the men now to continue as far as possible a program of instructive talks. The work is gladly done by the college men as a part of their extra-curriculum activity and is wholly without compensation. The appreciation of radio amateurs within a hundred-mile radius was apparent in January of this year, when at the invitation of the Union College wireless men about 300 radio fans gathered from the capital district to stand the first radio convention ever held in eastern New York State.

Radio Taught Schools Now!

An innovation in the Chicago public school system will be the "instructorless" classroom, according to Peter A. Mortenson, superintendent of the public schools of that city. Instructors will lecture into transmitting stations at central points, making it possible for one instructor to serve a number of classes. The classrooms will be equipped with radio receiving sets and loud talkers. Many subjects will be included in the new plan. Mothers at home may tune in on the lectures and get a pretty good idea of what their children are being taught.

Reflected Wave May Reduce Interference

Possibility of Developing Earlier Experiments Is Suggested as Means to Eliminate Congestion

Would Need Less Power

Such System Would Increase Secrecy of Public Radio Telephone Conversation

What are we going to do when every available wavelength in the ether is occupied? That is the question which is causing the United States quite a lot of concern in the endeavor to bring order out of the present chaos which characterizes radio communication. In fact the problem is universal, and it will undoubtedly be the chief topic to be discussed at the next meeting of the International Radio Convention.

To the novice perhaps the situation does not appear to be so difficult, but it must be realized that the number of wave-lengths which are theoretically at our disposal are not actually available in practice, due to the fact that tuning is not 100 per cent efficient.

Theoretically there should be 300,000,000 different wave lengths available, but in practice at the present time there are considerably less than 20,000, but even these are badly congested, and with the advent of broadcast radio-phone entertainment the congestion is becoming worse daily.

Engineers Will Solve Problem

The problem is not merely one for the legislators. Their efforts can only end in regulation, which of course will only ameliorate the situation and not solve the problem. The solution lies in the hands of the radio engineers, who will have to devise apparatus which will eliminate a great deal of the present interference, and at the same time give us a greater number of available wave lengths to operate on by making tuning more sharp both in the transmitting and receiving stations.

In theory it is possible to operate, for instance, on every individual wave length between 360 meters and 370 meters, but in actual practice this is just a wave band, and all stations operating on wave lengths within those two limits will interfere with each other.

The advent of continuous wave telegraphy and telephony has done a great deal toward making tuning sharper, so that wave lengths fairly close together can operate without interfering with each other, but the condition is by no means ideal.

The situation offers a wonderful opportunity for the inventor, particularly in view of the tremendous public interest in radio, and consequently the reward will be rich for success.

In this respect it might be pointed out that one of the solutions could possibly be reached by experimentation along abandoned lines. Why would it not be possible to investigate the possibilities of the reflecton of electro-magnetic waves? It seems to me there is an opportunity there, especially for wireless telegraphic work and radio telephone intercommunication between two fixed stations.

Waves Can Be Reflected

What I mean by reflection can be explained by giving an outline of some of the early work in the development of wireless. It was discovered early by the original experimenters that electro-magnetic waves were practically identical with light waves, with the exception that they were very much longer and, consequently, were not visible to the human eye. In every other respect, however, they were the same as light waves. It was found that they could be reflected, refracted and polarized, just the same as light waves could, although, of course, the methods for accomplishng this were different.

When Marconi first began his experiments he used two huge reflectors on his transmitting apparatus to "reflect" the waves in a certain direction. The development of wireless naturally took place on the sea, and reflection was quickly abandoned, because of the better results obtained on moving ships with the system of sending the waves out simultaneously in every direction.

Now that radio is so highly developed, a great deal of congestion could be eliminated by the use of reflected waves. By this I mean the development of apparatus which will focus the waves and send them out in one direction only, just in the same manner as a beam of light is focused in a searchlight and sent out in a straight line.

With such a system as this for trans-Atlantic communication, for instance, all the energy of the transmitting station would be utilized where it was most needed, and the present loss from radiation in all other directions would be eliminated. Thus less power would be required to bridge the distance over which it was desired to communicate, and furthermore the station in question would not interfere with others in the area in which it was not required to operate.

As we are about to have trans-Atlantic wireles telephony, such a directive system would be of material advantage, not only in cutting down the amount of power required and eliminating unnecessary interference, but also in the matter of secrecy, because it would narrow down the number of stations which could listen in on the conversation that was passing between the two stations.

Women Form Radio League

The Women's Radio League of America, Inc., held its first annual meeting on Tuesday evening, May 2, in room 907, Y. W. C. A. Building, Fifty-third Street and Lexington Avenue.

The following officers were elected: President, Miss Abbie Morrison; vice-president, Mrs. Eleanor G. Regan; secretary, Mrs. J. Koch; treasurer, Miss Elizabeth Rhodes.

The regular meetings of the league are held on the first and third Tuesday evenings of every month at the above address. Code practice for those who wish it is at 8 p. m., business meeting at 8:30 and the speaker of the evening at 9.

At the next meeting, on May 16, A. H. Hebert, an official of the American Radio Relay League and member of the second district executive council, will speak on "Co-operation and Organization."

All women interested in radio are invited to attend these meetings, and if desired courses in radio telegraphy or telephony can be arranged for.

They Call It "Radio Flu" in England

The picture shows Frank Walsh, a young British amateur, playing a game of chess by radio, in his home at Brighton, England. He has just wirelessed a move to his brother in Paris. Radio is being rapidly popularized in Europe

The Night Silence Reigned In the Ether About New York

An Amateur Describes Historic Occasion When the Nightly Jargon of Amateur Conversation Was Stilled in the Face of Disaster

By Charles William Taussig

Ten or fifteen years ago were the pioneering days of the radio amateurs in New York. That was the time when John Grinan ("J. G."), Walter Lemmon ("W. L."), Vermilya ("V. N."), "W. X.," "J. N.," "A. F." and many others held nightly conversations over the ether uncontrolled by the strong arm of the law. Waves were as bread as they were long in those days, with no limits to length.

All night long you could hear the New York amateurs talking to one another. The air was full of pleasantries, foolishness, bantering, squabbling, quarreling, jamming, in both the Morse and Continental codes—for at that time both of these codes were in use on the wireless. The Tower of Babel ran a poor second to the ether ten or fifteen years ago.

But there was one time, when disaster overtook the steamship Titanic, that the ether was clear. It was on the night of April 15, 1912. New York's little world of ether waves the day before was in its usual turbulence. It was impossible to get a message through the babel of amateur chatter. The usual flippancies went on among old radio friends, as was the custom every evening, with no one hearing the far cry from the vast space of the Atlantic Ocean nor the answering call of the succoring ship, the Carpathia, which came to the rescue of the survivors of the sinking Titanic.

Static Held Up List

New York's little radio population was aghast the following morning when reading of the catastrophe. Each thought unto himself, "How can I be of some assistance?" Little by little news was arriving in New York giving some of the details. The newspapers told us that the names of the survivors were being held up due to the severe static disturbances, and when night came only a partial list of the survivors had reached New York.

Without being told and with no organization to get them together, the amateurs of New York and vicinity discovered the part that was allotted to them to render assistance in this tragedy. At 8 o'clock the evening following the sinking of the Titanic, when I picked up my telephone receivers and tuned in, I was not greeted by the usual din and noise, but in its stead was an oppressive, awful silence. Except for the mournful rumblings and grumblings of the static not a sound was to be heard, and yet every amateur was at his post with the self-imposed task of trying to copy the names of the survivors of the Titanic that the U. S. S. Salem was trying to get through to the Newport (R. I.) naval station. 'Twixt static crashes each of us was copying the names of those who were fortunate enough to be saved.

Hour after hour we copied what little we could get, for the static would at times completely obliterate the signals from the Salem. Twice during the long period the silence was broken—once by the German station TWT, in the Trinity Building, on Broadway. Hardly had their loud spark been impressed upon the ether when the stentorian spark of Dr. Hudson warned them to keep out. Dr. Hudson, an ardent amateur, was the self-appointed patrolman that night, and his spark was the law, with no one disputing its authority. Once again during the night an amateur sent out a call, but he also bowed to the reproving signals from old D R.

Through the night we labored at our task, and when morning came our fragmentary record of the messages sent out by the Salem, pieced together with the messages copied by the Newport naval station, enabled the newspapers to publish a full list of the survivors.

Government Will Give Advice On Lightning Protection

Radio fans should give heed to fire insurance rules in connection with the "hooking up" of radio equipment, otherwise the rates on their properties may be raised or the insurance refused entirely, warns the Bureau of Standards of the Department of Commerce in calling attention to the fact that fire insurance regulations governing the installation of radio apparatus are to be revised.

According to the Department of Commerce, the rule which has heretofore covered radio installations is known as Rule 86 of the National Electrical (fire) Code, and in connection with a general revision of this code a change in this rule has been decided upon. The matter is being considered by a committee of the National Board of Fire Underwriters.

The Department of Commerce has prepared a mimeographed circular containing tentative requirements which have been suggested for adoption. It will probably be a matter of several months before the definite requirements are decided upon, but in the meantime any one who has real use for the above-mentioned circular may secure a copy by writing to the Bureau of Standards, Department of Commerce, Washington, D. C., for their letter circular No. 62, "Proposed Revision of Rule 86 of the National Electrical (fire) Code on Radio Equipment." William S. Boyd, chairman of the National Fire Protection Association, 175 W. Jackson Boulevard, Chicago, Ill., will also be glad to receive any suggestions

Colleges to Exchange News

A wireless news service has been planned by the Harvard Wireless Club. An effort will be made to co-operate other universities in broadcasting intercollegiate news of interest to the students and alumnae. The club is equipped with a set that will transmit 500 miles and receive any station east of the Mississippi. Schedules of the service and names of those colleges co-operating will be announced later.

State Police to Get Radio

The superintendents of state police of the states of New York, Massachusetts, Connecticut, Pennsylvania, New Jersey and Michigan, in conference in New York, seriously discussed the advisability of equipping their stations with radio systems. A system has already been installed in Pennsylvania which will be officially tested this week.

Long Distance Workers

Ship Operator in Chile Hears WJZ 4,000 Miles

While lying in the harbor of Iquique, Chile, on the west coast of South America, the operator of the steamship Santa Luisa of the Grace Line clearly heard the entire concert of WJZ. The distance separating Newark station from the steamship in an air line was 4,000 miles.

Not only did the operator hear the entire program, but a large number of visitors from the nitrate works ashore were on the ship at the time and they crowded into the wireless cabin to listen to the music. In a statement regarding the incident a representative of the line, after reading the operator's and captain's reports, said:

"The visitors, comfortably situated in the four corners of the room, listened with wonder and astonishment to the various melodies reproduced by the operator's instruments, which were heard quite distinctly, even to the extent in some instances of being able to distinguish the different instruments comprising the orchestra. The visitors left the steamer greatly impressed with this latest wonder of modern science, the employment of which was only made posible by the modern wireless equipment of the steamer."

Manufacturer States Patents Cover Crystal Sets

The following letter was received by The Tribune Radio from H. B. Johnson, general manager of the Acrex Corporation:

"Please be advised that the following patents cover the use of the crystal detector, the last two numbers given being circuit patents—836,531, 933,263, 1,104,065, 1,104,073, 1,158,228, 877,451, 904,222, 1,213,250, 1,127,921.

"These patents have been assigned to the Radio Corporation by the Wireless Specialty Apparatus Company, of Boston, the latter company reserving the right to manufacture under these patents. If you so desire you may look these patents up at the New York Public Library, Forty-second Street, and verify same.

"In order that you may not mislead your readers regarding patents on crystal detector sets we believe you should give some space to the fact that crystal detector receiving sets are patented."